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EXAMINER

ROSENBERGER, R

ART UNIT

PAPER NUMBER

2505

5

DATE MAILED:

12/03/91

This is a communication from the examiner in charge of your application.  
COMMISSIONER OF PATENTS AND TRADEMARKS

This application has been examined  Responsive to communication filed on \_\_\_\_\_  This action is made final.

A shortened statutory period for response to this action is set to expire 3 month(s), 0 day(s) from the date of this letter.  
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1.  Notice of References Cited by Examiner, PTO-892.
2.  Notice re Patent Drawing, PTO-948.
3.  Notice of Art Cited by Applicant, PTO-1449.
4.  Notice of Informal Patent Application, Form PTO-152
5.  Information on How to Effect Drawing Changes, PTO-1474.
6.  \_\_\_\_\_

Part II SUMMARY OF ACTION

1.  Claims 1 - 26 are pending in the application.

Of the above, claims \_\_\_\_\_ are withdrawn from consideration.

2.  Claims \_\_\_\_\_ have been cancelled.

3.  Claims \_\_\_\_\_ are allowed.

4.  Claims 1-26 are rejected.

5.  Claims \_\_\_\_\_ are objected to.

6.  Claims \_\_\_\_\_ are subject to restriction or election requirement.

7.  This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.

8.  Formal drawings are required in response to this Office action.

9.  The corrected or substitute drawings have been received on \_\_\_\_\_. Under 37 C.F.R. 1.84 these drawings are  acceptable;  not acceptable (see explanation or Notice re Patent Drawing, PTO-948).

10.  The proposed additional or substitute sheet(s) of drawings, filed on \_\_\_\_\_, has (have) been  approved by the examiner;  disapproved by the examiner (see explanation).

11.  The proposed drawing correction, filed \_\_\_\_\_, has been  approved;  disapproved (see explanation).

12.  Acknowledgement is made of the claim for priority under U.S.C. 119. The certified copy has  been received  not been received  been filed in parent application, serial no. \_\_\_\_\_, filed on \_\_\_\_\_.

13.  Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.

14.  Other \_\_\_\_\_

EXAMINER'S ACTION

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Claims 1-26 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, there is no claimed connection between the sensing step and the providing illumination step. It is unclear what connection is intended between the "plurality of independent signals" and the "plurality of different paths through" the specimen.

In claim 4, it is unclear to what the "different frequencies" refers; the light has an inherent frequency (wavelength), but may also be modulated at different frequencies, although such modulation is not clearly claimed.

In claims 4 and 5, there is no claimed connection between the different frequencies and the time sequence codes and the sensing, or any other part of the claimed subject matter.

In claim 7, there is no connection between the "means for providing illumination" and the "means for sensing," and no connection between the "means for developing a plurality of signals" and the "means for sensing".

In claim 10, there is no connection between the "means for demodulating" and the rest of the apparatus.

In claim 11, it is unclear if the claim is intended to include one ring or only a plurality of rings; the claim is

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inconsistent, see lines 8 and 9 which appear to allow a single ring, and line 12 which excludes a single ring. The claimed relationship between the plurality of rings and the source of illumination is not clearly set forth.

Claim 16 does not appear to limit claim 15; any means which is "responsive to the focused information for forming a signal" is a "detector".

In claim 18, a "fiber optic means" cannot monitor the energy received by the specimen. More structure is needed to perform this function. Also the relationship of such a means with the rest of the structure has been omitted.

In claims 20 through 25 it is not clear how the method steps further limit the structure of claims 7 and 11.

In claims 23 and 25 there is no structure claimed which allows the choice claimed.

In claim 26 there is claimed "a plurality of rings" with a "plurality of fiber optic bundles", but only "at least one" has any claimed use or function. This apparent claiming of superfluous elements is unclear. The "independent signals" at the end of the claim have no clear connection with the rest of the claimed structure.

Any claim not specifically mentioned above at least inherits the rejection above from its respective ~~parent~~ <sup>parent</sup> ~~Portrait~~ claim.

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The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --  
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Claims 1, 2, 6, 7 and 8 are rejected under 35 U.S.C. § 102(b) as being anticipated by Howarth.

Howarth provides illumination to specimen to be measured by way of a plurality of different paths through the specimen. A plurality of independent signals are developed at the same time representing optical information from the specimen, and an appropriate model is used to minimize inaccuracies of the measurement.

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Howarth also illuminates to a specimen which has a characteristic to be measured along each of the two different paths.

The length of Howarth is provided "at an angle" to the optical axis of the detection means; see figures 2A and 2B as in illustration of the light coming in at an angle to the detectors.

Claims 7, 9 and 10 are rejected under 35 U.S.C. § 102(b) as being anticipated by Tachibana.

Tachibana illuminates the specimen along two different paths and senses the information from the two paths and senses the information from the two paths separately. The reference teaches modulating the illuminating light (with choper 32) in the different paths with different modulating characteristics (phase) and demodulating the signals from the detector.

Claims 7, 8, 9, 11, 12 and 13 are rejected under 35 U.S.C. § 102(b) as being anticipated by Lebling et al.

The reference shows an apparatus for optical measurements of a sample with means for providing illumination to a specimen along a plurality of efficient paths. There are means for sensing the optical information from the specimen, and means for developing a plurality of independent symbols corresponding in number to the plurality of paths (see column 4, lines 8-30). The symbols are used with an appropriate modeling technique to minimize inaccuracies in the measurement of the specimen.

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The reference teaches an operating mode in which light is directed simultaneously along two or more paths (see column 4, lines 30-33.

The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Claims 14 and 20 are rejected under 35 U.S.C. § 103 as being unpatentable over Lebling et al.

It would have been obvious to choose appropriate angles to angle the fibers for the fibers of Lebling et al.

It would have been obvious to use the probe of Lebling et al to measure any sample, including samples "of small size".

Claims 1 through 7, 11 and 21-25 are rejected under 35 U.S.C. § 103 as being unpatentable over Lebling et al. in view of Azuma et al, Munekuni and Hasegawa.

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Lebling et al shows what is claimed except that it uses reflected light rather than transmitted light as claimed. It is known to measure the transmitted light existing a sample at a plurality of different angles; thus is shown by both Munekuni and Hasegawa. Since it is known that it is equivalent when using reflected light to use light at different angles (as shown by Lebling et al) and to use a single light source and receive light at different angles (as shown by Azuma et al). Those of ordinary skill would have recognized the equivalence with transmitted light as well and thus would have found it obvious to measure transmitted light in the basic manner of Lebling et al by directing light at more than one angle and measures the transmitted light with a single detector. The structural change to Lebling et al required for such is simply to provide a detector arrangement such as fiber 24 on the opposite side of a translucent sample.

It would have been obvious when providing such a detector on the far side of a sample to keep the detector on the near side as well because this would allow both reflective and transmittance tests and avoid increase the general utility of the device.

It would also have been obvious to duplicate the light sources rather than the detector because this would be an alternative method of obtaining the same result.

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Claims 15-17, and 19 are rejected under 35 U.S.C. § 103 as being unpatentable over Lebling et al in view of Fukui et al.

It would have been obvious to use other known light collection means than the sample fiber bundle 24 of Lebling et al. One such other known arrangement for such systems uses lens means to focus the light onto the detector; this known equivalent means is shown by Fukui et al.

Claim 18 is rejected under 35 U.S.C. § 103 as being unpatentable over Lebling et al. in view of Azuma et al.

It is known in such reflectance measuring arrangements to measure the source intensity, see detector 21 and fiber 13 of Azuma et al. It would have been obvious to provide such means in the device of Lebling et al because such means are known to be useful.

Claim 26 is rejected under 35 U.S.C. § 103 as being unpatentable over Azuma et al in view of Gerber and Ten Bosch et al.

Azuma et al shows the basic optical arrangement with a central illuminating beam and a plurality of fibers at different angles to measure light reflected from the sample. Azuma et al does not show rings of fibers. It is known and would have been obvious to so use rings of fibers to increase the amount of light reflected at each angle. Gerber shows it is known to use such rings of fibers in such reflectance measurements.

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Azuma et al does not show particular structure for the arrangement. It would have been obvious to make the basic structure in the form of a probe similar to that of Ten Bosch et al, keeping the central tubular element 145 of Azuma et al and arranging the fibers around the axis thereof.

Remarks

Tissue and Hubble et al show correcting reflective measurements by using light from the surface at a plurality of angles.

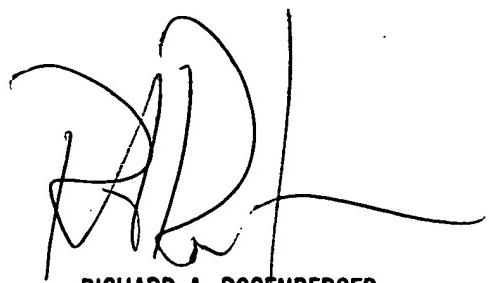
Hirleman et al shows collecting light by means of rings and fibers associated by the rings.

Borsboom show a sensor head which is in the form of an elongated probe with a central light-directing portion and a surrounding light-receiving portion.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to R.A. Rosenberger whose telephone number is (703) 308-4804.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0956.

Rosenbeger/vh  
November 25, 1991



RICHARD A. ROSENBERGER  
EXAMINER  
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